# Lobos Groundwater Basin

- Groundwater Basin Number: 2-38
- County: San Francisco
- Surface Area: 2,400 acres (4 square miles)

## Boundaries & Hydrology

The Lobos groundwater basin is located on the northwestern tip of the San Francisco peninsula, on the western side of a northwest trending bedrock ridge within the peninsula (Phillips et.al. 1993). The groundwater basin is made up of shallow unconsolidated alluvium underlain by less permeable bedrock, and is described by the watershed that lies between portions of the Presidio, Golden Gate Park and Lincoln Park. Lobos Creek, located along the southwestern perimeter of the Presidio, drains the watershed. In general, groundwater flow is northwest, following the topography. Average precipitation within the basin is estimated to be 24 inches per year.

## Hydrogeologic Information

### Water Bearing Formations

The primary water bearing formations within the Lobos groundwater basin are unconsolidated sediments and consist of dune sand, the Colma Formation, bay mud and clay, artificial fill and other relatively fine-grained surficial deposits (Phillips et.al. 1993). The Colma Formation is comprised of nearly flat lying fine-grained sand, silty sand, and occasional clay beds. Overlying this formation are dune sands, consisting of fine to medium-grained sand, which ranges from 0 to 150 feet in thickness (Phillips et.al. 1993). Unconsolidated sediments overlying the Colma Formation include bay mud, clay deposits, and artificial fill, composed of dune sand, silt, clay, and various debris (Schlocker, 1974). Bedrock underlying the basin consists of consolidated rocks of the Franciscan Complex (Schlocker 1974).

### Groundwater Recharge

Groundwater recharge for the San Francisco area occurs from infiltration of rainfall and irrigation water, and from leakage of water and sewer pipes. For the Lobos groundwater basin total recharge was estimated as 1,570 ac-ft per year, with recharge due to leakage from municipal water and sewer pipes accounting for about half of the total recharge (Phillips et.al. 1993).

### Groundwater Level Trends

No published water level data was found for the basin.

### Groundwater Storage

No published groundwater storage information was found for the basin.

### Groundwater Budget (Type A)

Using a hydrologic routing model Philips et.al. (1993) calculated total recharge for the Lobos basin to be approximately 1,570 acre-ft per year (for water years 1987-88.) The model was based on land use zones in the San

Francisco peninsula region.  Traditional groundwater budget calculations are complicated by the high degree of urban surface water runoff and leakage from the municipal water supply and waste-water discharge facilities.  A more detailed discussion of the groundwater budget can be found in the report by Phillips et.al. (1993).

### Groundwater Quality

**Characterization.**  No published groundwater quality information was found for the Lobos basin.  However limited water quality data for the surrounding basins is available and shows that the general character of groundwater for all basins beneath the entire San Francisco peninsula is similar (Phillips et.al. 1993).  Groundwater beneath the San Francisco peninsula is a mixed cation bicarbonate type, and generally considered "hard" ($CaCO_3$ concentrations between 121 and 180 mg/L).  Concentrations of most major dissolved constituents are within the guidelines recommended by the U.S. EPA.  Total dissolved solids vary from about 200 to over 700 ppm.  Elevated concentrations of nitrate and chloride are common, especially at shallower depths (Phillips et.al. 1993).

**Impairments.**  Groundwater within areas of the Lobos basin may contain high concentrations of nitrates, chloride, boron and total dissolved solids.  High nitrate levels and are attributed to groundwater recharge from sewer pipe leakage and possibly to applied fertilizer.  Elevated chloride and TDS levels are most likely due to a combination of leaky sewer pipes, seawater intrusion, and connate water (Philips et.al. 1993).

## Well Characteristics

| Well yields (gal/min) | | |
|---|---|---|
| Municipal/Irrigation | Range: N/A | Average:  N/A |

| Total depths (ft) | | |
|---|---|---|
| Domestic | Range: N/A | Average: N/A |
| Municipal/Irrigation | Range: N/A | Average: N/A |

## Active Monitoring Data

| Agency | Parameter | Number of wells /measurement frequency |
|---|---|---|
|  | Groundwater Levels | N/A |
|  | Water Quality | N/A |

## Basin Management

Groundwater management:

Water agencies

| Public | San Francisco Water Department |
|---|---|
| Private | |

## References Cited

Blake, M.C., Graymer, R.W., and Jones, D.L. 2000. *Geologic Map and Map Database of Parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California*. U.S. Geological Survey Miscellaneous Field Studies MF 2337, Online Version 1.0. (available online at http://geopubs.wr.usgs.gov/map-mf/mf2337/) .

Bonilla, M.G. 1998. Preliminary geologic map of the San Francisco South 7.5' quadrangle and part of the Hunters Point 7.5' quadrangle, San Francisco Bay area, California: A digital database. U.S. Geological Survey Open-File Report 98-354. (available online at http://wrgis.wr.usgs.gov/open-file/of98-354/)

Knudsen, K.L. et.al. 2000. Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California: A Digital Database. U.S. Geological Survey Open-File Report 00-444. (available online at http://geopubs.wr.usgs.gov/open-file/of00-444/).

Knudsen, K.L., Noller, J.S., Sowers, J.M., and Lettis, W.R. 1997. *Quaternary Geology and Liquefaction Susceptibility, San Francisco, California 1:100,000 Quadrangle: A digital database.* U.S. Geological Survey Open-File Report 97-715. (available online at http://wrgis.wr.usgs.gov/open-file/of97-715/)

* Phillips, S.P., Hamlin, S.N., and Yates, E.B. 1993. *Geohydrology, Water Quality, and Estimation of Ground-water Recharge in San Francisco, California, 1987-92.* U.S. Geological Survey Water-Resources Investigations Report 93-4019. Prepared in cooperation with the San Francisco Water Department. 69 p.

Schlocker, Julius. 1974. *Geology of the San Francisco north quadrangle, California.* U.S. Geological Survey Professional Paper 782. 109p.

**\* Denotes that the reference is a key one for the basin**

## Errata

Changes made to the basin description will be noted here.